## AMENDMENTS TO THE CLAIMS

Please amend the claims as set forth hereinbelow.

1.-18. **(cancelled)**

19. **(currently amended)** ~~The laser of Claim 18, further comprising:~~

A laser, comprising:

a laser gain medium having a first end face and a second end face;

a low-index optical waveguide integrated with the laser gain medium on a laser substrate and optically end-coupled at its proximal end with the laser gain medium at the first end face;

a waveguide grating segment optically coupled to the laser gain medium through the integrated waveguide, the waveguide grating segment providing optical feedback into the laser gain medium to support laser oscillation substantially restricted to a single longitudinal mode;

a compensator for controlling a longitudinal mode wavelength;

at least one wavelength reference and at least one detector for generating a laser-output-wavelength-dependent error signal; and

a feedback mechanism for controlling the compensator in response to the error signal, thereby maintaining the longitudinal mode wavelength substantially locked with respect to the wavelength reference.

20. **(original)** The laser of Claim 19, wherein:

the wavelength reference comprises a pair of reference waveguide grating segments having respective center wavelengths bracketing a center wavelength of the waveguide grating segment, each waveguide grating segment receiving at an input end thereof a portion of laser output and transmitting a fraction of the received portion of the laser output to an output end,

the detector comprises a pair of photodetectors, each photodetector receiving the transmitted fraction of the laser output from the output end of a corresponding one of the reference waveguide grating segments,

the error signal is derived from the pair of photodetectors, and

the feedback mechanism controls the compensator in response to the error signal so as to maintain the longitudinal mode wavelength substantially locked with respect to the center wavelength of the waveguide grating segment.

21. **(original)** The laser of Claim 20, wherein the waveguide grating segment and the pair of reference waveguide grating segments are formed on a common substrate.

22. **(original)** The laser of Claim 20, wherein the waveguide grating segment is formed on a first substrate and the pair of reference waveguide grating segments are formed on a second substrate separate from the first substrate.

23. **(original)** The laser of Claim 19, wherein the compensator comprises a thermo-optic element and a heating element, heating of the thermo-optic element by the heating element shifting a longitudinal mode wavelength of the composite laser resonator.

24. **(original)** The laser of Claim 19, further comprising a second compensator for controlling a waveguide grating segment center wavelength.

25. **(original)** The laser of Claim 24, further comprising:
at least one external wavelength reference and at least one secondary detector for generating an secondary laser-output-wavelength-dependent error signal; and
a secondary feedback mechanism for controlling the second compensator in response to the secondary error signal, thereby maintaining the waveguide grating segment center wavelength substantially locked with respect to the external wavelength reference.

26.-36. **(cancelled)**

37. **(original)** A laser, comprising:
a laser gain medium having a first end face and a second end face;
a waveguide grating segment optically coupled to the laser gain medium through the first end face, the waveguide grating segment providing optical feedback into the laser gain medium to support laser oscillation substantially restricted to a single longitudinal mode;
a compensator for controlling a longitudinal mode wavelength;

a pair of reference waveguide grating segments having respective center wavelengths bracketing a center wavelength of the waveguide grating segment, each waveguide grating segment receiving at an input end thereof a portion of laser output and transmitting a fraction of the received portion of the laser output to an output end;

a pair of photodetectors, each photodetector receiving the transmitted fraction of the laser output from the output end of a corresponding one of the reference waveguide grating segments; and

a feedback mechanism for controlling the compensator in response to an error signal,

wherein

the error signal is derived from the pair of photodetectors, and

the feedback mechanism controls the compensator in response to the error signal so as to maintain the longitudinal mode wavelength substantially locked with respect to the center wavelength of the waveguide grating segment.

38. **(original)** The laser of Claim 37, wherein the waveguide grating segment and the pair of reference waveguide grating segments are formed on a common substrate.

39. **(original)** The laser of Claim 37, wherein the compensator comprises a thermo-optic element and a heating element, heating of the thermo-optic element by the heating element shifting a longitudinal mode wavelength of the composite laser resonator.

40. **(original)** The laser of Claim 37, further comprising a second compensator for controlling a waveguide grating segment center wavelength.

41. **(original)** The laser of Claim 40, further comprising:

at least one external wavelength reference and at least one secondary detector for generating an secondary laser-output-wavelength-dependent error signal; and

a secondary feedback mechanism for controlling the second compensator in response to the secondary error signal, thereby maintaining the waveguide grating segment center wavelength substantially locked with respect to the external wavelength reference.